

What is claimed is:

1. An apparatus comprising:
one or more Input/Output (I/O) conductors, wherein the I/O conductors pass
through a hermetic seal such that a first end of the I/O conductors reside on a non-
5 hermetic side of the hermetic seal and a second end of the I/O conductors reside on a
hermetic side of the hermetic seal within a metal case of the apparatus;
a printed circuit interconnect substrate residing on the hermetic side of the
hermetic seal; and
one or more ceramic chip capacitors mounted on the printed circuit
10 interconnect substrate, wherein a first end of each capacitor is electrically connected
via the interconnect to the second end of an I/O conductor and a second end of each
capacitor is electrically connected via the interconnect to the metal case.
2. The apparatus of claim 1, wherein the printed circuit interconnect substrate is
15 mounted on the hermetic side of the hermetic seal.
3. The apparatus of claim 1, wherein the printed circuit interconnect substrate
includes a printed circuit board material.
- 20 4. The apparatus of claim 3, wherein the printed circuit board material includes a
ceramic.
5. The apparatus of claim 3, wherein the printed circuit board material includes
FR4.
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6. The apparatus of claim 1, wherein the printed circuit interconnect substrate
includes a flexible circuit tape.
7. The apparatus of claim 6, wherein the flexible circuit tape includes polyimide
30 tape.

8. The apparatus of claim 1, wherein the printed circuit interconnect substrate is a multi-layer substrate.

5 9. The apparatus of claim 1, wherein the printed circuit interconnect substrate includes an electrically conductive medium.

10. The apparatus of claim 9, wherein the electrically conductive medium includes solder.

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11. The apparatus of claim 9, wherein the electrically conductive medium includes conductive epoxy.

12. The apparatus of claim 9, wherein the electrically conductive medium includes wire-bonds.

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13. The apparatus of claim 1, wherein the capacitors have a dielectric breakdown voltage of about 1200 volts.

20 14. The apparatus of claim 1, wherein the capacitors have a dielectric breakdown voltage within a range of about 200 to 1500 volts.

15. The apparatus of claim 1, wherein the capacitors are discrete capacitors.

25 16. The apparatus of claim 15, wherein the capacitors include surface mount packaging.

17. The apparatus of claim 1, wherein the capacitors are included in a multi-chip package.

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18. The apparatus of claim 1, wherein the capacitors are adapted to filter electromagnetic interference.
19. The apparatus of claim 1, wherein the hermetic seal is part of an implantable medical device.
20. The apparatus of claim 19, wherein the hermetic seal includes a ceramic.
21. The apparatus of claim 19, wherein the hermetic seal includes an epoxy.
22. The apparatus of claim 19, wherein the hermetic seal includes a glass.
23. The apparatus of claim 1, wherein the I/O conductors are pins.
24. The apparatus of claim 1 wherein the I/O conductors are wires.
25. The apparatus of claim 1 wherein the I/O conductors are conductive traces.
26. The apparatus of claim 25, wherein the conductive traces are included in a printed circuit interconnect that accommodates surface mounting of electronic components.
27. A method of integrating electromagnetic interference (EMI) filters and feedthroughs on an implantable medical device, the method comprising:
- forming a hermetic seal around a plurality of Input/Output (I/O) conductors, the I/O conductors passing through the hermetic seal;
- forming EMI filter circuits using discrete capacitors mounted on a printed circuit substrate; and
- attaching the printed circuit substrate and the EMI filter circuits to the I/O conductors.

28. The method of claim 27, wherein the method further includes mounting the printed circuit substrate and the EMI filter circuits on the hermetic side of the hermetic seal.

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29. The method of claim 27, wherein forming the hermetic seal includes using ceramic.

30. The method of claim 27, wherein forming the hermetic seal includes using
10 glass.

31. The method of claim 27, wherein forming the hermetic seal includes using epoxy.

15 32. The method of claim 27, wherein forming the hermetic seal includes forming a plurality of hermetic seals.

33. The method of claim 27, wherein forming EMI filter circuits includes mounting the capacitors using conductive epoxy.

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34. The method of claim 27, wherein forming EMI filter circuits includes mounting the capacitors using solder.

35. The method of claim 27, wherein forming EMI filter circuits includes
25 mounting the capacitors using wire-bonds.

36. The method of claim 27, wherein attaching the printed circuit substrate and the EMI filter circuits to the I/O conductors includes using conductive epoxy.

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37. The method of claim 27, wherein attaching the printed circuit substrate and the EMI filter circuits to the I/O conductors includes using solder.

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